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# **NOAA Year 2000 Program Plan**

**U.S. DEPARTMENT OF COMMERCE**

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**National Oceanic and Atmospheric Administration**

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and Administrator

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## **I. IDENTIFICATION SECTION**

This plan describes the activities the National Oceanic and Atmospheric Administration (NOAA) will undertake to resolve the challenges presented by the coming century change. NOAA consists of five Line Offices and a number of Staff and Program Offices. A chart of the NOAA organization is presented in Appendix A. The NOAA Year 2000 focal point responsible for developing the overall NOAA Year 2000 Program Plan is Jordan B. Matejcek, Manager, Systems Engineering Staff, Systems Acquisition Office (SAOx3). He can be reached at (301) 713-3345. Address e-mail to: jordanm@sao.noaa.gov.

## **II. EXECUTIVE SUMMARY**

This document describes NOAA's plan to transition its operations successfully into the next century.

NOAA is dedicated to describing and predicting environmental changes, and conserving and managing the coastal and marine resources of the Nation. NOAA sees the future as a world in which a comprehensive understanding of the environment strongly influences societal and economic decisions. To accomplish this vision, NOAA has developed a strategy consisting of the two primary missions of *Environmental Assessment and Prediction* and *Environmental Stewardship* with seven inter-related goals. A stable infrastructure and administrative and human resources, as well as NOAA's underlying capabilities as a national resource for research, observing systems, and environmental data and information services, are essential to NOAA's goal-based strategy.

NOAA's diversity, represented by its historical achievements, and its current goals, has led to the development of specialized Information Technology (IT) environments. In recognition of NOAA's diversity, NOAA management chose to implement a decentralized approach to the Year 2000 Problem. Each NOAA Line, Program, or Staff Office has been delegated the responsibility for planning and implementing actions to resolve its respective Year 2000 issues. NOAA offices will report progress on resolving the Year 2000 Problem through detailed quarterly reports and quarterly progress meetings chaired by the Deputy Under Secretary.

NOAA's awareness activities will last the entire life of the Year 2000 project. There is a continuing need to ensure that everyone knows of the Year 2000 problem, how to resolve Year 2000 problems correctly or prevent them from occurring, and what actions NOAA and its offices are taking in regards to the problem.

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The estimated cost to complete Year 2000 resolution activities is approximately \$5.6 million. This estimate was developed from results of inventory and assessment efforts completed during the Assessment Phase. The use of emerging COTS tools and our progress through the Renovation and successive phases could cause this estimate to change. NOAA offices developed detailed inventories and assessed commercial-off-the-shelf (COTS) software and hardware and determined COTS vendors' future plans. As a result of the inventory and assessment efforts, Renovation and Validation Phase tasks and schedules have been further defined. NOAA office Year 2000 Project Plans have been updated and revised.

During the Renovation Phase, NOAA will make the corrections that will ensure its software and systems will operate properly during the transition to the new millennium and beyond. Necessary actions may range from minor code revisions to major re-engineering or redevelopment of critical applications. Systems whose cost of correction exceeds any benefits gained by continued operation will be retired. Implementation of a date standard will be considered during this phase.

NOAA will rely on its normal ADP upgrade/replacement process to correct most of its non-compliant COTS software and hardware. For those offices that have Government-developed software, NOAA will primarily use its normal ADP maintenance process for repair of the non-Year 2000 compliant software.

The unique nature of the Year 2000 Problem and NOAA's IT environment, which includes multitudinous interfaces, real-time systems, and large on-line systems, will present NOAA with a multitude of difficult problems in its testing for Year 2000 compliance. The NOAA offices are considering many different strategies for accomplishing the Year 2000 testing effort including the use of special software, off-site test environments, and contractor support.

While some preliminary plans for validating corrected software and systems have been made at this time, the development of detailed validation plans requires data from the execution of the Assessment and Renovation Phases. Significant effort in Validation will not occur until the first quarter of 1998.

Until details about what systems and databases will be renovated or replaced and how the problems will be corrected, useful implementation planning activity cannot take place. It is anticipated that significant implementation planning activity will begin in the second-half of 1998.

NOAA-wide Year 2000 program management activities will be accomplished by the NOAA Year 2000 Task Force, whose members represent all NOAA Line, Staff, and Program Offices.

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The NOAA Year 2000 Task force will disseminate Year 2000 information throughout NOAA and coordinate NOAA-wide Year 2000 issues or documents. See Appendix B for a list of the NOAA Year 2000 Task Force Members.

Program management activities within the NOAA offices are determined by the office and each has approached the issue differently. Some have formed project teams to manage and coordinate the Year 2000 resolution activities while others have passed the responsibilities for resolution down to their internal offices.

### **III. INTRODUCTION**

This plan contains information on how NOAA will address the issues associated with the transition to the next century. This plan is a high-level document which describes NOAA activities in summary fashion. The individual office plans describe lower level events, activities and schedules. This plan will be updated annually, or more often if warranted.

#### **A. Background**

NOAA is an agency dedicated to the description and prediction of changes in the Earth's environment, and the conservation and management of the Nation's coastal and marine resources. Historically, NOAA's role has been to predict environmental changes, protect life and property, provide decision makers with reliable scientific information, and foster global environmental stewardship. NOAA's vision for the future is a world in which societal and economic decisions are coupled strongly with a comprehensive understanding of the environment. To accomplish this vision, NOAA has developed a strategy consisting of seven inter-related goals grouped within the following two primary missions of *Environmental Assessment and Prediction* and *Environmental Stewardship*.

#### **Environmental Assessment and Prediction:**

- ▶ Advance Short-Term Warning and Forecast Services;
- ▶ Implement Seasonal to Interannual Climate Forecasts;
- ▶ Predict and Assess Decadal to Centennial Change; and
- ▶ Promote Safe Navigation.

#### **Environmental Stewardship:**

- ▶ Build Sustainable Fisheries;
- ▶ Recover Protected Species; and

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► Sustain Healthy Coasts.

The execution of NOAA's goal-based strategy depends strongly on a stable infrastructure and administrative and human resources, as well as the underlying capabilities of NOAA as a national resource for research, observing systems, and environmental data and information services.

The five NOAA Line Offices are primarily responsible for the accomplishment of the goals. Each Line Office is focused on specific goals, although the Line Offices contribute, in varying amounts, to the accomplishment of all goals. The NOAA Staff and Program Offices provide infrastructure and administrative and technical resources to support goal accomplishment.

**B. NOAA Year 2000 Program Organization**

Diversity, in both the nature of NOAA's historical achievements, as well as its current goals, has led to the development of specialized Information Technology (IT) environments within NOAA. This specialization extends into the Line Offices where often very different IT environments are needed to accomplish their missions. In recognition of NOAA's inherent diversity, a top-down, centralized approach to resolving the Year 2000 issues was viewed as being inefficient and overly burdensome. Instead, NOAA management chose to implement a decentralized approach giving each NOAA Line, Program, or Staff Office the responsibility for planning and implementing actions to resolve its respective Year 2000 issues. The NOAA offices report progress on resolving the Year 2000 Problem through written quarterly reports and quarterly progress meetings chaired by the Deputy Under Secretary for Oceans and Atmosphere (DUS).

**C. Risks**

The NOAA offices' dependence upon normal practices and processes to handle most of the Year 2000 issues creates a risk related to the stability of base funding. Any erosion of base funding may jeopardize the funding earmarked to handle the Year 2000 issues. This would require additional internal reprogramming since resolving the Year 2000 Problem is not optional and cannot be moved out in time.

**IV. AWARENESS PHASE**

Awareness is not a one-time event. This phase, unlike subsequent phases, lasts the entire life of the Year 2000 project. There is a continuing need to ensure that everyone knows of the Year 2000 problem, how to correctly resolve Year 2000 problems or prevent them from occurring, and

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what actions NOAA and its offices are taking in regards to the problem. Non-compliant programming and date-representation practices must be publicized continuously to account for employee turnover and a focus on current priorities. Installing fully compliant commercial-off-the-shelf software and hardware is necessary, but not sufficient, since it does not prevent use of non-compliant practices. For example, some Year 2000 compliant spreadsheets will assume "19" for the century if a two-digit year is entered. Programmers have to know about Year 2000 compliant programming techniques, scientists have to know how to identify data which might cause Year 2000 problems, and administrative support needs to understand the issues so that they are able to deal with vendors. Therefore, continued awareness is crucial if NOAA is to transition smoothly into the next century.

NOAA has already completed several Year 2000 awareness activities. The conduct of the preliminary assessment, which included a preliminary inventory of NOAA software and systems, created awareness of the Year 2000 Problem throughout all levels of NOAA. Briefings on the Year 2000 Problem and the results of the preliminary assessment were given at NOAA management and executive meetings.

The NOAA Year 2000 Task Force serves as a source of information about all aspects of the Year 2000 Problem. The NOAA offices will continue to carry out the awareness activities, as well as all other Year 2000 resolution activities, within their organizations. These awareness activities will include education on recommended Year 2000 procurement procedures. An example of one office's (National Weather Service) Awareness Phase activities follows.

Completed Awareness Phase Activities:

- contacted all NWS focal points directly;
- published articles in NWS-wide publications;
- NCEP published separate articles relating to the unique issues of the Centers;
- NCEP supercomputers began providing a daily countdown to year 2000; and
- Distributed Y2K-recommended contract language to appropriate purchasers.

On-Going Awareness Phase Activities:

- continued development of vendor compliance lists;
- Y2K information dissemination - Web Pages, etc.;
- publishing articles on Y2K compliance issues; and
- publishing Y2K status reports.

## **V. ASSESSMENT PHASE**

NOAA used the Assessment Phase to gather and analyze information in order to determine the

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size and scope of the Year 2000 Problem. *The Assessment Phase is now complete for all Mission-Critical Systems needing repair.* Information about the size and scope of the Year 2000 Problem was necessary to make reasonably accurate estimates of the correction cost in terms of dollars and work years. The primary deliverable from this phase were updates to the NOAA offices' Year 2000 plans.

During the Assessment Phase each NOAA office performed the following activities to the degree necessary for its situation:

- ▶ Code inventory;
- ▶ Pilot project conduct to identify technical issues requiring resolution;
- ▶ Year 2000 cost estimates;
- ▶ Renovation and Validation Phase scheduling considering
  - risk analyses results,
  - system prioritizations for future phases, and
  - validation approach decisions; and
- ▶ Project plans revisions based on results of Assessment Phase activities.

#### **A. Completed Activities**

The DUS initiated the NOAA Year 2000 Task Force in June 1996. The Task Force, whose members represented all NOAA offices, initiated activities in July 1996. The first task given the Task Force was the development of a rough-order-of-magnitude (ROM) cost estimate for resolving the Year 2000 Problem for NOAA. This was completed in August 1996.

The ROM cost estimate was reviewed and discussed by NOAA management during September 1996. It became apparent that because the estimate was based on very conservative NOAA-wide assumptions and included all costs, irrespective of how the work would be funded or who would do the work, the estimate could not be used to characterize an individual NOAA office's Year 2000 Problem resolution activities. However, the ROM cost estimate task was useful in that it generated a great deal of interest and activity about the Year 2000 Problem throughout NOAA. Also, preliminary assessment efforts were conducted and a "quick-look inventory" was developed.

During the ROM cost-estimate discussions it became apparent that the diversity of the NOAA offices required a decentralized approach to resolving the Year 2000 Problem. Only through a decentralized approach could the unique IT environments of the offices be accommodated effectively and efficiently. Therefore, the DUS delegated to each office the responsibility for resolving its Year 2000 Problem. Each office was also to submit budget estimates for resolving



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its Year 2000 Problem. These estimates were updated during the Assessment Phase. The current cost estimates are listed in Table 1. As noted, these estimates could change as we move through the Renovation and successive phases.

<b>NOAA Office</b>	<b>Cost (\$K)</b>
Office of Finance and Administration (OFA)	1,100
Office of NOAA Corps Operations (ONCO)	0
National Weather Service (NWS)	750
National Ocean Service (NOS)	120
National Environmental Satellite, Data, and Information Service (NESDIS)	3,526
Office of Oceanic and Atmospheric Research (OAR)	118
National Marine Fisheries Service (NMFS)	0
NOAA Total	5, 614

**Table 1. NOAA Year 2000 Cost Estimates**

## **B. NOAA Summary**

NOAA offices expanded the preliminary assessment efforts conducted to support the initial ROM cost estimate. In general, detailed inventory efforts were conducted, including the determination of operational programs that have missing source code or are not capable of modification. Assessments of commercial-off-the-shelf (COTS) software and hardware as well as determination of COTS vendors future plans were also accomplished. Some pilot projects were conducted which aided in estimating the amount of time required to make programs or data bases Year 2000 compliant.

In summary, NOAA has 166 mission-critical-systems (MCS); 86 are compliant or have been made compliant as of the date of this plan. At the start of the Year 2000 Program, NOAA determined that 19 MCSs were to be replaced, 27 MCSs were to be repaired, 35 MCSs were to be retired and 3 MCSs were under development. Note that the reasons the 3 MCSs were being developed were independent of the Year 2000 Problem. *NOAA does not have any systems being developed solely because of the Year 2000 Problem.*

## **C. NOAA Office Summaries**

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This section contains summaries of the results of the NOAA offices' Assessment Phase activities.

### C.1 NOAA Staff and Program Offices

Most of the NOAA Staff and Program Offices utilize COTS software and hardware or software and systems controlled and maintained by other organizations (primarily OFA) to perform their functions. Most of the offices have determined that their normal COTS software and hardware maintenance and replacement will result in compliant systems being in place before the end of 1999. In addition, the ONCO and the OFA will have to resolve Year 2000 issues with Government-developed software.

The ONCO has determined that the problems existing in its current hardware and developed software can be corrected by its normal maintenance processes and that no additional funding is needed to accomplish its correction activities. The ONCO has 4 MCSs, 2 are to be replaced and 2 repaired.

The OFA is dependent upon automated systems to conduct NOAA's administrative operations. These systems use close to two million lines of legacy software code. This software is dependent upon dates and does need to be modified to function properly in the Year 2000.

An inventory of OFA's legacy software has been conducted and system managers have estimated the number of staff months needed to fix the problem. These time estimates were converted to a cost by using an estimated cost per staff month. The overall estimate for OFA to correct the Year 2000 Problem in its legacy code is approximately \$1.1 million using contract labor. The OFA has 7 MCSs; 3 are compliant or have been made compliant as of the date of this plan, 2 are to be replaced and 4 are to be repaired.

Below is a list of significant factors and assumptions which affect the OFA estimates.

- ▶ Hardware costs - Costs for hardware are not included. The assumption is that all of OFA's older PC's will be replaced before the year 2000. Budget requests based on other program justifications have been submitted. These requests must result in actual funding for the assumption to be valid.
- ▶ CAMS - Most of OFA's legacy systems are scheduled to be replaced by CAMS. However, the risks associated with the CAMS project that include slippages in the CAMS implementation schedule and potential missing functionality in the CAMS early implementation will require some Year 2000 repair work to begin. To mitigate the risks

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associated with CAMS and to ensure that the financial, payment and commitment tracking process continues into the Year 2000, OFA has begun with the following:

1. conversion of the NOAA financial management system (FIMA) and the commitment tracking system, Financial Analysis and Commitment Tracking System (FACTS); and
  2. a phased conversion by fiscal year of the NOAA Payment System (NPS) and Administrative Payment System (APS) , with an ever watching eye on the progress of the CAMS project.
- ▶ COTS Software - No costs associated with COTS software have been included. OFA has assumed that COTS software will be corrected by the software developers and will be available to OFA through normal maintenance or license agreements.
  - ▶ GOTS Software (software supplied by another Government organization) - OFA uses several systems which were developed and are maintained by the Office of the Secretary (OSEC). Although these systems are scheduled to be replaced by CAMS, a Year 2000 problem would emerge if CAMS is not delivered as planned.

## C.2 National Marine Fisheries Service (NMFS)

The NMFS conducted its assessment activities as part of a project to define an IT architecture to support them in the future. One of the first steps of the Information Systems Architecture (ISA) Project is determining the NMFS IT baseline. The NMFS used this opportunity to collect detailed inventory information related to the Year 2000 Problem.

The NMFS determined that all its MCSs would be replaced by newer applications utilizing the NMFS standard Oracle DBMS. A significant number of the applications have already been replaced. NMFS has 121 MCSs; 75 are compliant or have been made compliant as of the date of this plan, 11 are to be replaced, and 35 are to be retired. Please note that the NMFS's MCSs are very modest in size and complexity.

## C.3 National Ocean Service (NOS)

The NOS, like NOAA, is a very diverse organization. Accordingly, NOS has delegated Year 2000 resolution responsibilities to its offices. The effect the Year 2000 Problem has on NOS offices is quite varied. Some offices are minimally affected because only COTS applications and non-susceptible equipment are used, while others are greatly affected due to the amount of

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developed software and/or susceptible equipment used in their operations.

The NOS has 15 MCSs; 4 are compliant or have been made compliant as of the date of this plan, 3 are to be replaced, 7 are to be repaired, and 1 MCS is under development.

#### C.4 Office of Oceanic and Atmospheric Research (OAR)

The OAR completed an assessment of its Year 2000 vulnerability. The OAR has 2 MCSs; 1 is to be repaired and the other is under development.

#### C.5 National Weather Service (NWS)

Many of the NWS Year 2000 initiatives started several years ago. In 1989, the NWS migrated its administrative applications to the Oracle RDBMS environment and, at that time, converted tables to a four-digit date format for "as of dates" and "fiscal year" identifiers. In addition, NWS wrote into its IRM plan for the 5 years from 1992 to 1997, a requirement that IT contracts be Y2K compliant. During this same time period, before 1992, strategic plans were developed to migrate from IBM operating systems to UNIX-based systems, factoring in Year 2000 compliant capability. In 1994, the NWS Office of Systems Operations began storing all 5-year archive tapes with four-digit years.

The NWS completed its assessment activities and has updated some of the original preliminary assessment data. The primary area that appears to have significant non-Year 2000 compliant software is the National Centers for Environmental Prediction (NCEP). NCEP has a large amount of legacy code, some of which was developed more than a decade ago. NCEP also has significant non-Year 2000 compliant databases. The other offices of the NWS have minor Year 2000 compliancy issues which are planned to be resolved by the offices' normal ADP maintenance processes. The COTS software and hardware which have been identified as non-compliant will be replaced by NWS as part of its normal maintenance process.

Specific tasks accomplished by NWS during the Assessment Phase:

- Assembled Y2K Mission Critical System Teams;
- Identified all other systems and core business areas;
- Completed comprehensive system inventories;
- Developed NWS mission critical and non-mission critical compliance efforts cost and FTE requirements;
- Developed system specific impact statements;

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- Developed overall NWS impact statement;
- Identified NWS-specific issues related to date formats;
- Defined “consensus” opinions for some conversion options;
- Began development of an automated system profile; and
- Developed the NWS Project Plan.

The NWS has 8 MCSs; 2 are compliant or have been made compliant as of the date of this plan; 2 are to be replaced, 3 are to be repaired, and 1 is under development.

#### C.6 National Environmental Satellite, Data, and Information Service (NESDIS)

For NESDIS, the Year 2000 Problem is a very diverse challenge. A single plan solution will not solve each unique Office/Center situation because of the diversity of NESDIS’s IT architecture. Some NESDIS Offices are strictly LAN-based activities. They need to remain aware of the Year 2000 Problem and follow what is happening with PC Vendors and LAN providers. However, NESDIS has other Offices/Centers that have several million lines of code, provide critical products and services, and have a heterogenous hardware environment. Some of these Offices/Centers began addressing the Year 2000 Problem several year ago.

As part of the initial ROM cost estimate effort, NESDIS conducted a preliminary survey of each Office/Center to gather and analyze information in order to determine the size and scope of the problem. This survey requested the number of lines of code developed in-house or by a third party. Each line of code was identified as either Year 2000 compliant or non-compliant. Additional information was gathered on the number of COTS licenses, data bases, PCS, workstations, mini/supermini-computers, mainframes, and supercomputers. The preliminary assessment indicated that NESDIS had 3,320K non-Year 2000 compliant developed source lines of code (SLOC), 2,733K compliant developed SLOCs, 2,625 licenses for non-compliant COTS packages, 792 GBs of non-compliant databases, 1,037 non-compliant PCS, 283 non-compliant workstations, and 5 non-compliant computers of various capacity.

The normal equipment replacement program and current software maintenance capability will correct most of the identified problems. However, additional funds may be needed and the preliminary estimated cost for NESDIS is \$3,526,000. The breakout of estimated costs is given below.

Developed software	\$2,160K
3rd party software	\$345K
COTS	\$425K

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Databases	\$500K
Hardware	\$100K
NESDIS Total	\$3,530K

***\*\* Rob, please correct above table so that the total becomes \$3,526--your current cost estimate\*\****

In some cases, management may have to obtain additional resources and/or shift priorities to accomplish Year 2000 changes.

As part of the Assessment Phase activities, NESDIS completed a more detailed inventory and created a relational database to keep track of all aspects of NESDIS's systems and the progress of the correction efforts. NESDIS now has a much more detailed characterization of the overall Year 2000 Problem. Project teams have been set up in the Offices/Centers in order to track more closely progress and problems as well as offering an opportunity to share information learned.

Additional pilot projects will be conducted to estimate the amount of time required to actually make a program Year 2000 compliant. The information gained from the pilots will enable NESDIS to refine their overall cost and schedule estimates.

Subsequent to completion of the pilots and documentation of code to be modified to make it Year 2000 compliant, NESDIS will conduct a risk analysis that will determine if NESDIS will be able to make all the conversions in a timely manner. If necessary, each system will be assigned a priority based on its purpose and end products. Special consideration will be given to systems that produce output for other Federal agencies or other sources.

An assessment of vendor products and tools will be conducted to determine whether there will be costs associated with upgrades to Year 2000 compliant releases. NESDIS has completed an evaluation of Year 2000 assessment and renovation tools for FORTRAN. At this time, NESDIS is considering the purchase of a tool for assessment and automatic correction of FORTRAN programs. In addition, NESDIS has begun researching and analyzing Year 2000 testing tools. If Year 2000 tools are purchased, the procurement strategy is to use existing contract vehicles.

## **VI. RENOVATION PHASE**

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As has been previously noted, NOAA has been modifying its software to handle the Year 2000 problem for several years. During the Renovation Phase as identified in this Plan, NOAA will continue to make the corrections that will ensure its software and systems will operate properly during the transition to the new millennium and beyond. Necessary actions may range from minor code revisions to major re-engineering or redevelopment of critical applications. Retirement of systems whose cost of correction exceeds any benefits gained by continued operation also will occur. Implementation of a date standard also will be considered during this phase.

Major activities that may be performed during this phase include:

- ▶ Implementation of standardized date routines;
- ▶ Re-engineering of selected systems/programs;
- ▶ Retiring selected systems/programs;
- ▶ Selecting code modification strategy (expand/logic/sliding window/bridge);
- ▶ Installation and use of selected Year 2000 tools;
- ▶ Development of bridges and filters;
- ▶ Re-creation of missing source code; and
- ▶ Changing files and databases.

## **A. NOAA Summary**

NOAA has been repairing Year 2000 related software problems for several years prior to the issuance of this Plan. Accordingly, within NOAA there is a great deal of diversity in the offices' approaches to correcting non-Year 2000 compliant software and hardware. A common theme is the offices' reliance on normal ADP upgrade/replacement process to correct all non-compliant COTS software and hardware. For those offices that have Government-developed software, there is a dependence on normal ADP maintenance process for repair of the non-Year 2000 compliant software.

## **B. NOAA Office Summaries**

This section contains summaries of the NOAA Offices' Renovation Phase plans.

### **B.1 NOAA Staff and Program Offices**

Most of the NOAA Staff and Program Offices will conduct renovation activities by following current replacement and/or maintenance procedures. The OFA, because of its large amount of legacy code which is affected by the Year 2000 Problem and a dependence upon a new system,

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CAMS, to replace the legacy code, has a more difficult challenge.

OFA's Year 2000 Plan has three phases.

#### FY 1997 Actions:

Systems that were not to be replaced by CAMS ( e.g., CLS and Correspondence Control System) began their Year 2000 conversion activities using in-house personnel. In the 4th quarter an assessment of the status of CAMS was done in order to develop detailed conversion plans for the coming year. Systems based on the ORACLE database management system were modified to use four digit year fields. Three applications identified for Year 2000 repair in FY 1997 were completed. They were (1) the National Logistics Support Center's (NLSC) Consolidated Logistics System (CLS), (2) the Correspondence Control System, and (3) FIMA's Daily Edit Program and Associated Output Data Files. As part of the FIMA Year 2000 repair effort, bridge software has been written to allow "feeder" systems to FIMA to continue to work properly. The dates have been expanded to four digits before being entered into FIMA. The conversion work completed in FY 1997 was approximately 25% of the total work to be completed.

#### FY 1998 Actions:

Based on the FY 1997 reassessment, a mix of in-house and contract labor will be used to modify systems not being initially replace by CAMS. Detailed plans will be formulated based on the then current CAMS schedule. If the risk of CAMS not being ready is low, this effort will be scaled back. Again, in the 4th quarter a further reassessment will be done to determine future actions. In FY 1998, approximately 50 percent of the conversion effort will be completed.

#### FY 1999 Actions:

The availability of CAMS for the year 2000 would be known at this point. It may be determined that no further conversion of legacy systems is required. Any conversions that are required will be done with a combination of in-house and contract labor. At most, 25% of effort remains to be done in FY 99 with contract and in-house labor.

## B.2 National Marine Fisheries Service (NMFS)

The NMFS does not have any systems undergoing or scheduled to undergo renovation. Existing systems will be, or have already been, replaced by new Year 2000 compliant systems or will be



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retired prior to 2000.

### B.3 National Ocean Service (NOS)

NOS is renovating 7 of its MCSs. Work has begun on these systems and NOS plans to complete the renovation activity in FY 1998.

### B.4 Office of Oceanic and Atmospheric Research (OAR)

OAR has only 1 MCSs to be renovated, the OAR Financial Management Systems. The renovation work has begun and is on schedule.

### B.5 National Weather Service (NWS)

The NWS will resolve most of its Year 2000 Problems through the use of its normal ADP upgrade cycle and its normal ADP maintenance process. The NCEP, with its larger problems will require additional resources and extra-normal processes. NWS has been renovating its MCSs for several years and these efforts continue. In FY 1997 the NWS:

- began identification of internal and external data exchange interfaces;
- identified consensus approaches for implementing changes to key meteorological products; and
- developed implementation plans for ensuring that the enterprise electronic mail system is Year 2000 compliant.

In FY 1998 NWS plans to accomplish the following Renovation Phase Tasks:

- Distribute renovation phase checklist to Teams/Focal Points;
- Identify methodology for documenting code/system changes;
- Identify requirements for communicating changes to customers;
- Teams develop detail conversion schedules;
- Develop Master COTS Upgrade Schedule; and
- Implement Master COTS Upgrade Schedule.

All Renovation Phase tasks will be completed prior to 1/1/1999.

### B.6 National Environmental Satellite, Data, and Information Service (NESDIS)

NESDIS started the Renovation Phase in the first quarter of FY 1995 and will finish this Phase in

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the fourth quarter of 1998. At this time, NESDIS has completed the Renovation Phase for two of its nine MCSs. NESDIS plans to develop and implement standardized date routines as an early activity. Based on the prioritization of applications and systems developed in the Assessment Phase, NESDIS plans to re-engineer selected applications and systems, retire systems and programs deemed too costly to repair or which have become obsolete, and redevelop critical systems and applications for which the source code is missing. As part of the renovation, NESDIS plans to determine the current and probably future states of its external interfaces and develop the necessary bridges and filters. Files and databases will also be modified as required during this period.

## **VII. VALIDATION PHASE**

Testing for Year 2000 compliance will present NOAA with a multitude of difficult problems. These problems arise because of the unique nature of the Year 2000 problem and NOAA's IT environment which includes such special characteristics as multiple interfaces, real-time systems, and large on-line systems. Special issues associated with validating renovated systems for Year 2000 compliance include lack of test cases for regression testing, negative impacts due to input from non-compliant systems, and unexpected impacts from embedded software or systems. Other Year 2000 validation issues include the behavior of controllers, firmware based micro-code, operating systems, real-time clocks, and other less obvious system-level resources. The testing or validation of single applications for compliance creates its own set of problems. The testing of the target application must be coordinated with companion applications which may pass date data to assure the entire system of applications is safe to run. The system-level software (e.g. operating system, database management system) also must be compliant if the testing is to be successful.

During this phase major activities may include:

- ▶ Creation of an isolated testing environment;
- ▶ Determining storage and processing capacities needed for test environment;
- ▶ Resolving technical issues, such as
  - how files will be aged, testing strategy (volume vs. individual cases),
  - establishment of validation databases, and
  - coordination of future validation efforts with on-going development;
- ▶ Regression testing of all renovated systems; and
- ▶ Future date testing of all renovated systems.

While some early validation activities have been accomplished, it is premature to have detailed

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office-wide validation plans at this time. While some needed information was collected during the Assessment Phase, additional work needs to be accomplished by the NOAA Offices during the Renovation Phase to enable the development of detailed validation strategies and plans. The development and implementation of a shared common independent testing environment will be considered when enough data has been gathered to make valid cost-benefit assessments. It is anticipated that significant effort in this phase will not occur until the first quarter of 1998.

## **VIII. IMPLEMENTATION PHASE**

During the Implementation Phase, NOAA will stagger the renovated/recreated and validated systems into operation. The implementation of all changed systems, including vendor software and hardware, will be scheduled. Operational and synchronization issues will be given prime consideration in schedule development. Decisions on implementation strategies, such as use of parallel processing and sites for file conversion, as well as decisions on how to handle archive files and backup/recovery plans will be made when sufficient information has been developed from the earlier phases.

Until details about which systems and databases will be renovated or replaced and how the problems will be corrected, useful implementation planning activity cannot take place. It is anticipated that significant implementation planning activity will begin in the second-half of 1998.

## **IX. PROJECT MANAGEMENT**

A NOAA Year 2000 Task Force, whose members represent all NOAA Line, Staff, and Program Offices, was initiated by the NOAA Deputy Under Secretary for Oceans and Atmosphere in June 1996 and began activities in July 1996. Jordan B. Matejcek, Manager, Systems Engineering Staff, NOAA Systems Acquisition Office was named the Task Force Leader and is the NOAA focal point for the Year 2000 Problem. The NOAA Year 2000 Task Force disseminates Year 2000 information throughout NOAA, responds to special queries, and coordinates NOAA-wide Year 2000 issues, reports, and documents.

### **A. NOAA Summary**

Each major NOAA office is totally responsible for resolving its Year 2000 issues and has approached the issue of Year 2000 program management differently. Some have formed project teams to manage and coordinate their Year 2000 resolution activities, while others have passed

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the responsibilities for resolution down to internal offices.

## **B. NOAA Office Summaries**

This section contains summaries of the NOAA offices' approach to Year 2000 Project Management.

### **B.1 NOAA Staff and Program Offices**

Most of the NOAA Program and Staff Offices are modest in size and their Year 2000 activities are managed by a Year 2000 coordinator. Often, the Year 2000 coordinator is also the person responsible for the office's Information Technology Plan or in an IT leadership role. Generally, status reporting for the Year 2000 activities will follow the office's normal reporting procedures.

In OFA, the Systems Division Chiefs form the OFA Year 2000 Project Team. The Systems Division Chiefs will report on the status of Year 2000 efforts to the Director of the OFA Information Systems Office during their regular quarterly meetings. The OFA Year 2000 Point of Contact (POC) is Natalie D. Smith (OFA1x1). She can be reached at (301) 713-3525x114.

The ONCO Year 2000 project management occurs along ONCO organizational lines. IT Coordinator representatives at ONCO Headquarters and field offices coordinates and reports on progress and problems associated with the Year 2000 maintenance activities at their location. Management status reports for Year 2000 maintenance activities are instituted quarterly for CY 1997 through CY 1998 and monthly for CY 1999. The ONCO POC is Gregory Bass (NCx1). He may be reached at (301) 713-3425x179.

### **B.2 National Marine Fisheries Service (NMFS)**

The National Information Management Board will control NMFS's Year 2000 resolution activities. The Information Systems Architecture Project gathers the initial inventory data, while contractors will complete the assessment and renovation activities. The NMFS POC is Jim Sargent (F/RE1). He may be reached at (301) 713-2372.

### **B.3 National Ocean Service (NOS)**

NOS Year 2000 project management is delegated down to the NOS offices. Within the offices Year 2000 project management activities are managed by a variety of organizations ranging from reliance on the ADP unit to office-wide teams. The NOS POC is Richard Kissel (N/MB3). He may be reached at (301) 713-3050.

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#### B.4 Office of Oceanic and Atmospheric Research (OAR)

Within the OAR, the Laboratories and other OAR organizations are responsible for resolving Year 2000 issues. The OAR POC is Paul Quicker (R/E). He may be reached at (301) 713-2474.

#### B.5 National Weather Service (NWS)

Within the NWS, Year 2000 resolution activities are treated as normal business, therefore the normal management and reporting structures are used. Within an NWS Office, Year 2000 project management activities are managed by a variety of organizations ranging from reliance on the ADP unit to office-wide teams. The NWS POCs at Barbara Brenkworth (W/MB33) and Mark Rew (W/MB33). They can be reached at (301) 713-0262.

#### B.6 National Environmental Satellite, Data, and Information Service (NESDIS)

NESDIS has formed a Systems Project Team to manage their Year 2000 activities. The team consists of representatives from each NESDIS Office and Center. The members of the Data Systems Advisory Council (DSAC) form the core of the team with additional representatives as required. These representatives will participate in developing Year 2000 correction plans for their respective office or center. The NESDIS POCs are Rob Mairs and Mary Adams (E/SP1). They may be reached at (301) 457-5165.

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**APPENDIX A**

**ORGANIZATION CHART**

**OF THE**

**U. S. DEPARTMENT OF COMMERCE**  
**NATIONAL OCEANIC AND ATMOSPHERIC**  
**ADMINISTRATION**